

WHAT IS CLAIMED IS:

1. A physiological monitor for measuring a blood constituent concentration within a tissue portion of a subject, said monitor comprising:

a polarized light source adapted to illuminate said tissue portion with an incident light beam;

a magnetic field generator configured to impose a magnetic field on said tissue portion while illuminated by said light source, said magnetic field imparting a rotation in the plane of polarization of said incident light beam as it propagates through said tissue portion and emerges as a transmitted light beam;

a polarimeter having an input responsive to said transmitted light beam and an output corresponding to said rotation; and

a signal processor in communications with said polarimeter output so as to compute an output corresponding to a mean pathlength estimate of said tissue portion.